

THE SCIENTIFIC REVOLUTION  
1550-1700 C.E.



*Activating Words*

*ID these terms!*

*Geocentric Theory*

*Heliocentric Theory*

*Scientific Method*

*Scientific Revolution*

*Isaac Newton*

*Galileo Galileo*

*Johannes Kepler*

**SSWH13 The student will examine the intellectual, political, social, and economic factors that changed the world view of Europeans.**

- a. Explain the scientific contributions of Copernicus, Galileo, Kepler, and Newton and how these ideas changed the European world view.
- b. Identify the major ideas of the Enlightenment from the writings of Locke, Voltaire, and Rousseau and their relationship to politics and society.

*How did these periods of time contribute  
to the Scientific Revolution?*



***The Renaissance***

## ***The Reformation***





## ***Connection to the Standard!***

- a. Explain the scientific contributions of Copernicus, Galileo, Kepler, and Newton and how these ideas changed the European world view.

### ***Essential Question:***

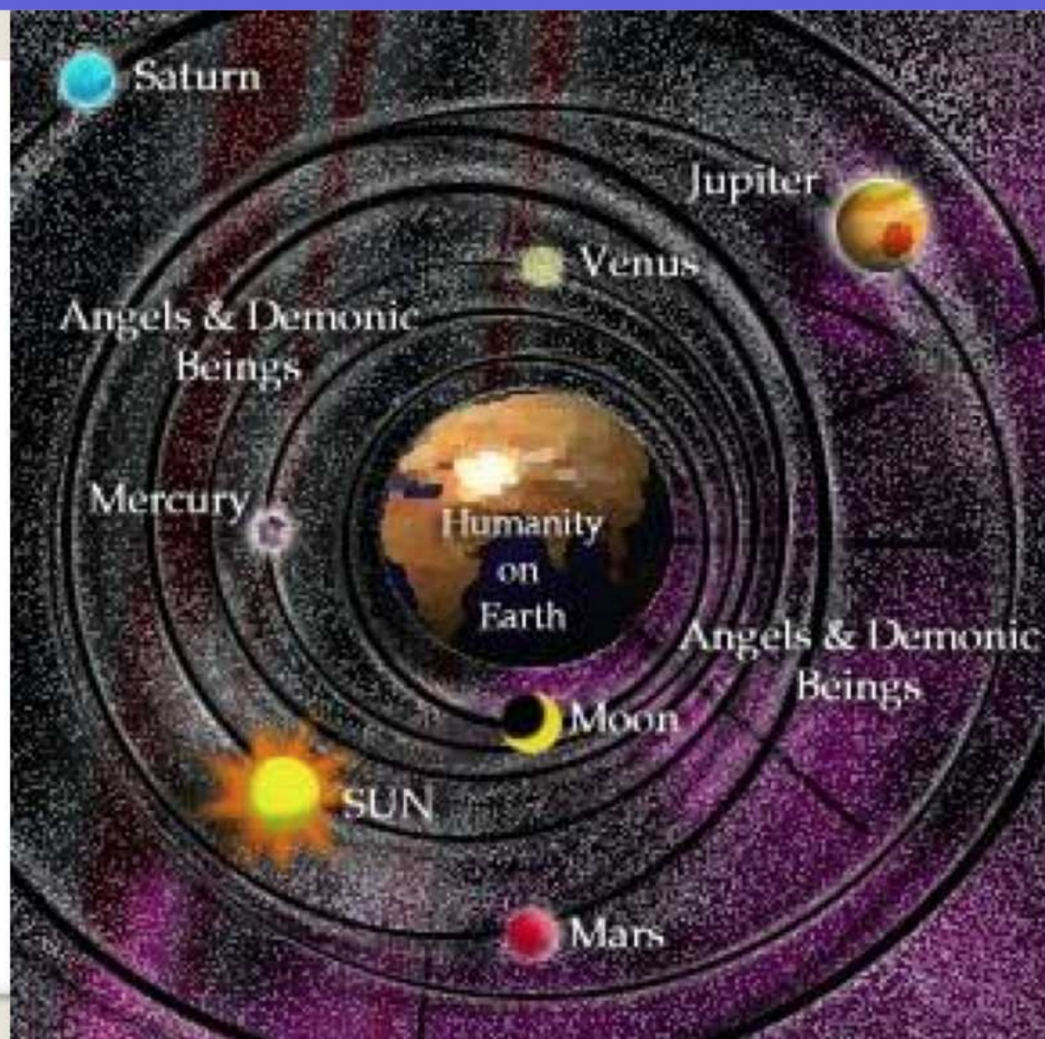
***1) What were the contributions of Copernicus, Galileo, Kepler?***

# **First Thing to Change**

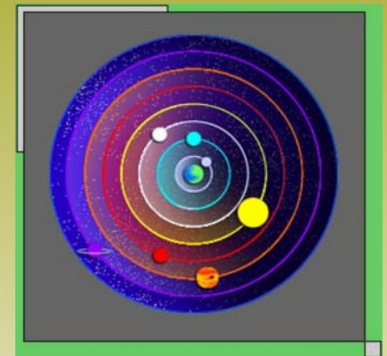
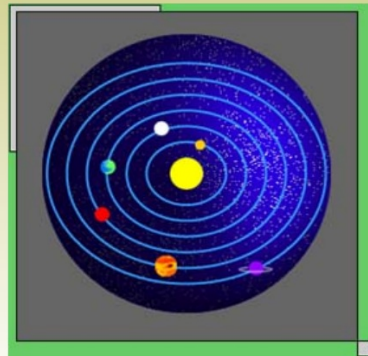
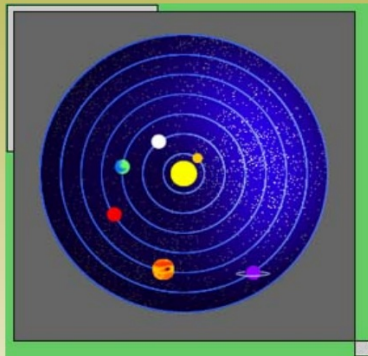
**NEW DIRECTIONS IN ASTRONOMY AND PHYSICS**

**The Ideas of the Classical Greek  
Astronomer Ptolemy Are Still  
Accepted By Most People As Being  
Correct.**

**GEOCENTRICISM**



*Ptolemy - Kepler - Copernicus*  
*Three theories of the Universe*  
*Whose was whose?*

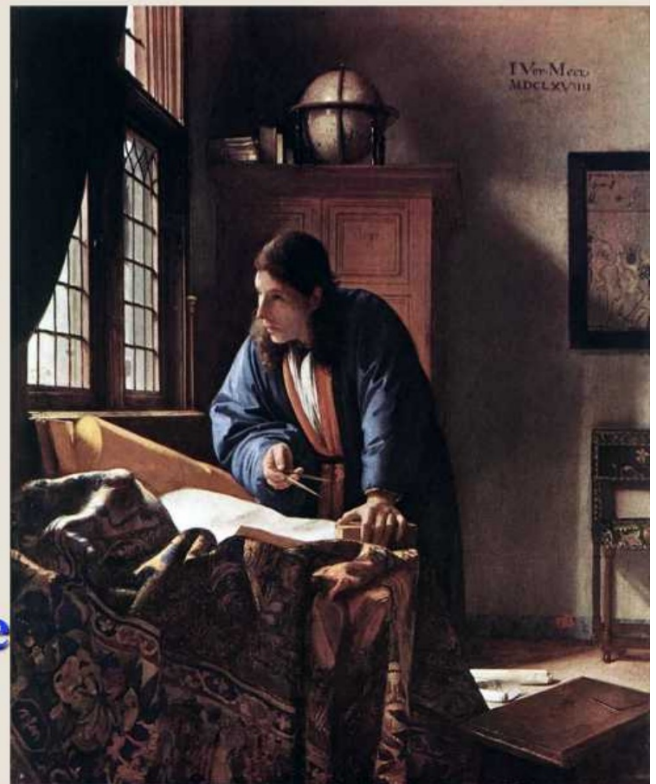




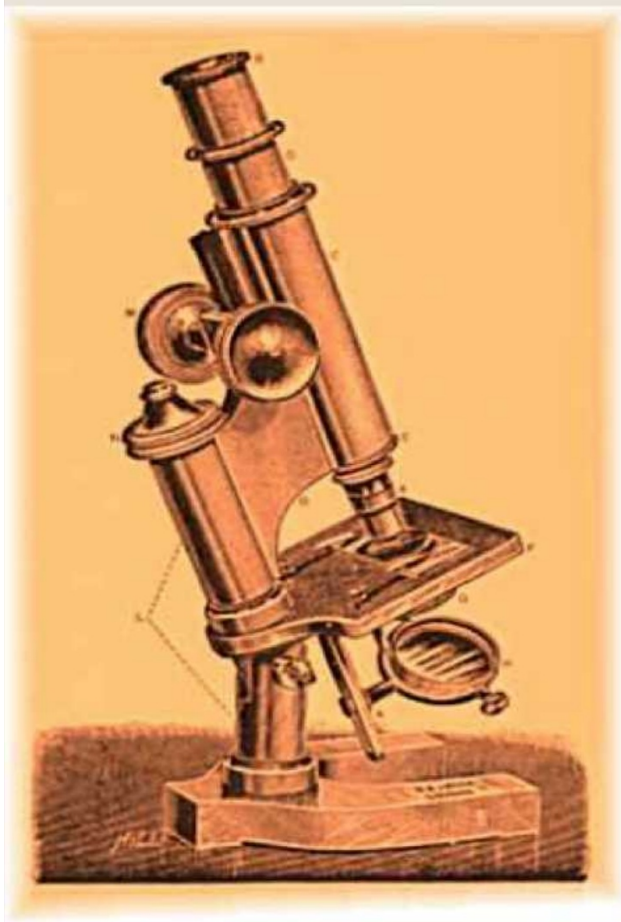
# THE SCIENTIFIC REVOLUTION

## CREATION OF A NEW WORLDVIEW

- Questioning of Old Knowledge and Assumptions
- Gradual Replacement of Religious and Superstition Presumptions
- Gradual Rise of Science and Reason



## Causes of the Scientific Revolution



- **The Italian Renaissance**
- **Exposure to Muslim Ideas about Science and Indian Ideas about Mathematics and Chinese Technology**
- **Renewed Emphasis on Mathematics and Science**
- **Need to Solve Navigational Problems of Long Sea Voyages**
- **Better Scientific Instruments**

# Defenders of the Old Ways



- **Who Still Supports Classical Medieval Ideas about Mathematics and Science?**
- **An Institute That Is Being Challenged on All Sides During the 15th and 16th Centuries.**
- **An Institute That Was Once the Most Powerful in Europe and Does Not Want to Get Up that Control Easily**
- **The Catholic Church**

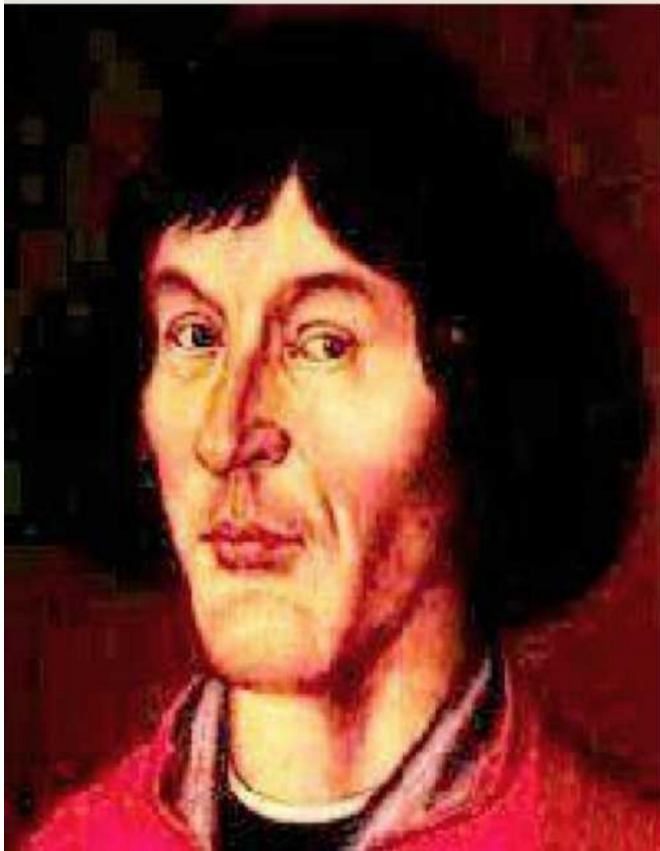
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*Scientific  
“Revolutionaries”*

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## Copernicus (1473-1543 C.E.)



- Sun-Centered Universe
- HELIOCENTRISM
- Challenged Circular Orbits
- Universe of Staggering Size
- Earth No Different than Any Other Planet
- *On the Revolutions of the Heavenly Spheres* (1543 C.E.)

## Johannes Kepler (1571-1630 C.E.)



- **Student of Brahe**
- **Planetary Motion Conforms to Mathematical Formula**
- **Elliptical Orbits**
- **Planets do not Move at Uniform Speeds in their Orbits**

# Isaac Newton (1642-1727 C.E.)



- ❑ English scientist, mathematician
- ❑ Argues for a Universe Governed by Natural Laws
- ❑ Theory of Gravitation (define on pg. 625)
- ❑ Development of Modern Calculus
- ❑ Believed God to be a “clockmaker” – putting everything on motion.
- ❑ Three Laws of Motion



## *Galileo's Discoveries*



*Galileo's telescope*

- *Built a telescope in 1609.*
- *Studied heavens.*
- *Supported ideas of Copernicus.*

*In what way did he disagree with Aristotle?*

*pg. 625*







*What's the Story?*

*Galileo's conflict with the Church!*

*pg. 625*



## ***Connection to the Standard!***

- a. Explain the scientific contributions of Copernicus, Galileo, Kepler, and Newton and how these ideas changed the European world view.

### ***Essential Question:***

***1) What were the contributions of Copernicus, Galileo, Kepler ?***

***Answer the Essential Question!!***



**pg. 625-626**

**reveal**

## ***The Scientific Method***

***How was the Scientific Method of exploring ideas different from looking to history for answers?***

***Why might the Church dislike the ideas of Bacon and Descartes?***

# THE SCIENTIFIC REVOLUTION

## DISCOVERIES IN OTHER SCIENCES

➤ Medicine: First Vaccines Developed: Smallpox

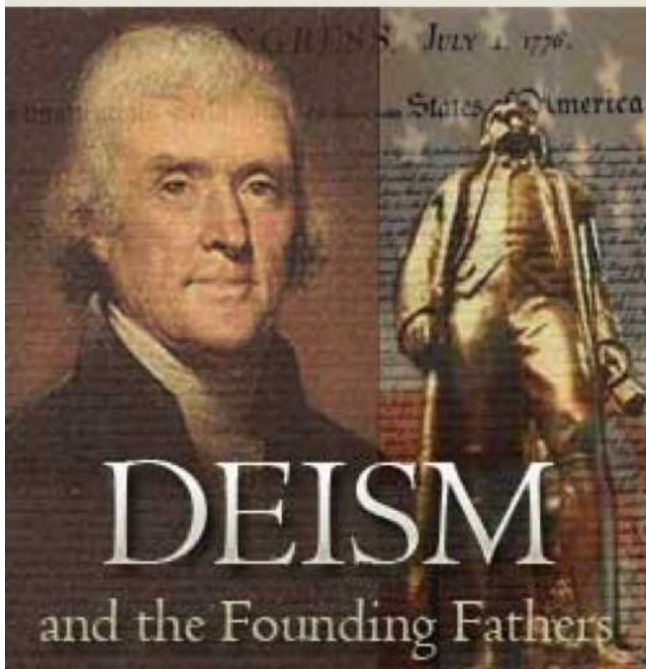
➤ Anatomy: Better Understand of How Human Body Worked

– Dissection of Human Bodies

- Microscope invented
- Thermometer Invented
- Barometer Invented



## Consequences of the Scientific Revolution



- **Progress Through Human Reason**
- **"De-Spiritualized" and De-Mystified the Universe**
- **Mechanical View of the Universe**
- **Deistic View of God -- God Viewed as the Cosmic Capitalist**



# The Enlightenment

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**Key Figures and  
Philosophies of the 18th  
Century Europe**





**SSWH<sub>13</sub>b:** Identify major ideas of the Enlightenment from the writings of Locke, Voltaire, and Rousseau, and their relationship to politics and society.

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Words to know:

Enlightenment, Social Contract, John Locke, philosophe, Voltaire, Montesquieu



# The Enlightenment



- An Intellectual Movement in 18th Century Europe Applying Methods and Principles of the Scientific Revolution to Issues of Political, Economic, and Social Reform
- Focused on the Power and Goodness of Human Reason to lead to Progress
- Profoundly Secular--Worldly Explanations for All Things



## What was it?



- Progressive, Rationalistic, Humanistic Worldview
- Emerged out of the Scientific Revolution and Culminated in the French Revolution
- Main Followers = Rising Middle Class
- France = Center of Enlightenment
- Optimism about Mankind's Abilities





# Causes of the Enlightenment

*“The Key, and Most Significant, Cause of the Enlightenment was the Scientific Revolution”*

- **Ideas of Newton and Locke**
- **Stability and Commercial Prosperity of Britain and Need for Administrative and Economic Reform in France**
- **Consolidation of Print Culture-Spread Ideas**





# Two Views on Government

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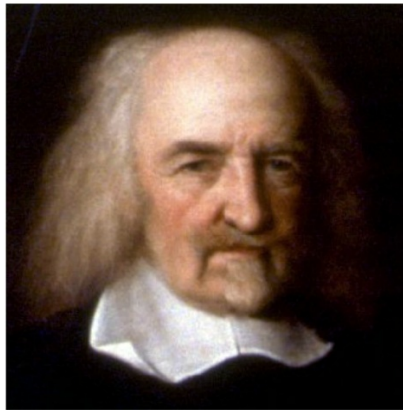
Hobbes Social Contract vs. John Locke's Natural Rights

***Essential Question: What were the major ideas of the Enlightenment thinkers Locke, Voltaire, and Rousseau?***

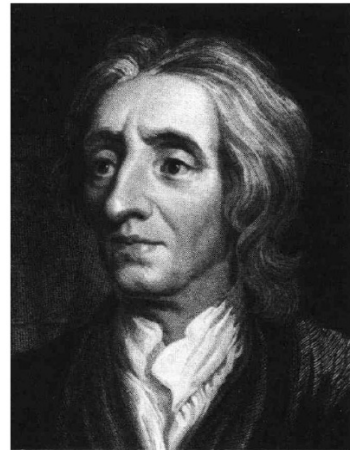
*Two Views on Government*  
*Outline the section:*  
*"Two Views on Government"*

*After you outline the section -  
Compare and Contrast the differences*

*Thomas Hobbes*



*John Locke*

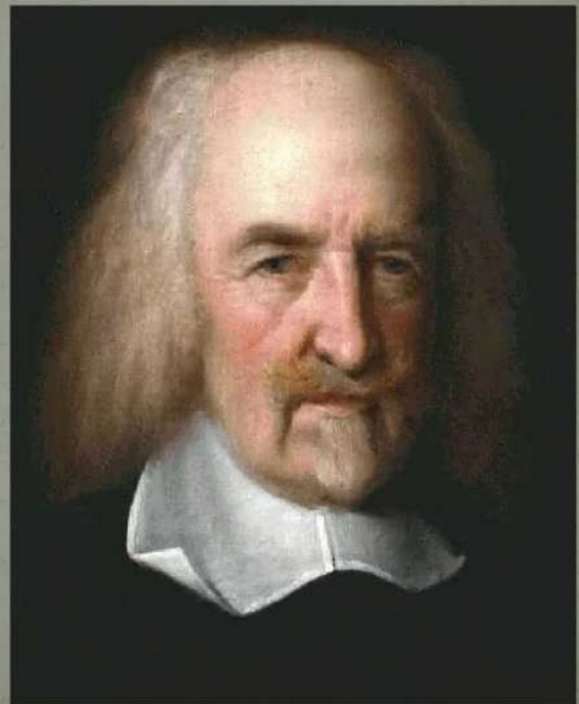


*pg. 629-630*



- English political thinker
- Wrote *"The Leviathan"* – all men were naturally "selfish and wicked"
- Justification of absolutism as secular and "scientific"
- Supported Absolute Power of Monarch/King
- Power Derives from People who Give it to Monarch--No Divine Right
- Ideal State is that with the Greatest Security
- Laws Created by Humans to Protect Themselves
- Social Contract--King is King and Subjects are Subjects

## Thomas Hobbes

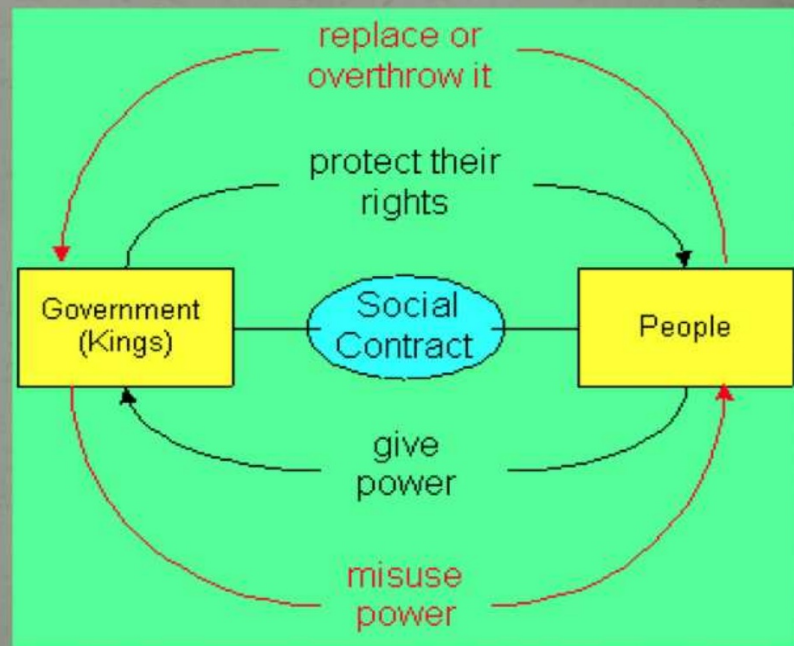






## Hobbes - Social Contract

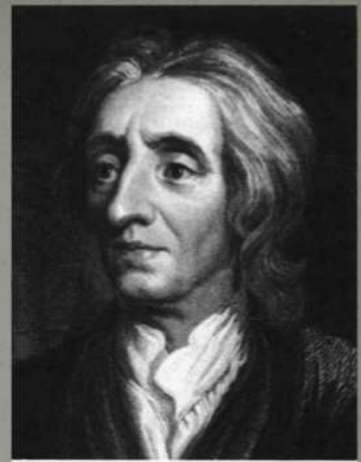
- The Implied Agreement by which People Group Together to Form Governments
- People Give up Individual Rights to Protect Social Order = Safety





# John Locke

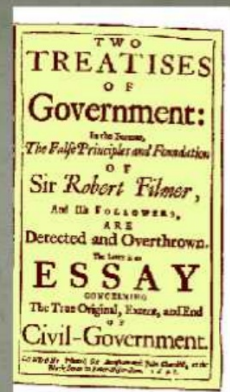
- **Most Influential English Political Philosopher of 17th Century**
- Believed Humans learned from experience – improve themselves.
- **Believed all men had “natural rights” to Protect Life, Liberty, and Property**
- **Natural Right to Rebel Against Tyranny**
- **Believed in Revolution and Representative Government. (Consent of the Governed)**
- **Constitutional Government--To Place Limits on Government.**
- **American and French Revolutions were based on these ideas.**





# Natural Rights

- Inherent in All People
- Some argue “God Given Rights”
- Universal and Inalienable
- Natural Law-- Discover Fair, Just, and Natural in Political and Social Through Reason
- Life, Liberty and Property (Pursuit of Happiness)



*We the People*

*The Citizen and the Constitution*







Hobbes?

Or Locke?

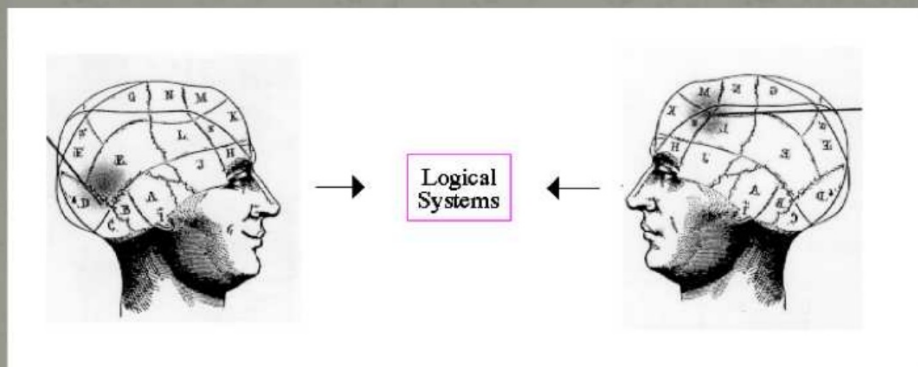






# Rationalism

- Everything was to be submitted to the rational, critical, scientific way of thinking--making reason ultimate
- Brought conflict between Enlightenment thinkers and the church





# Empiricism

- All Knowledge is Derived from Experience
- Gives Observation Priority





# Skepticism

- **Doubt Everything that is Beyond Sense Experiences or What is Obtained by Controlled Experiments or Mathematics**



ABOUT SKEPTICISM





# Deism

- The Watchmaker
- God is Creator who was Present at the Beginning, but is now Removed
- Belief in God, but often Critical of Church
- God does not Work in the Lives of Humans or Institutions
- God Rewards and Punishes Individuals According to their Moral Conduct
- Reject Fundamental Doctrines of the Christian Faith







## Opinion of the Middle Class



- Enlightenment Thinkers Were for the Middle Class and Against the Traditional Social Order
- Size and Increasing Power of the Middle Class



# Philosophes

- One of History's Most Influential Groups of Intellectuals
- Ideas Embraced by Educated Elite
- Systematic Criticism of Human Custom and Tradition through Reason
- Gradual Reform and Progress was Goal, not Revolution
- Ideals: Reason, Secularism, Equality, Progress, Individualism
- Read about philosophes on p. 630





Who was the Most Symbolic Man of  
the Enlightenment?

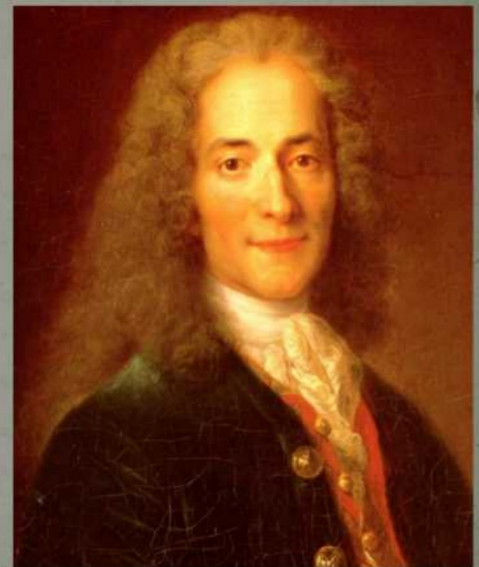
*Voltaire*





## Voltaire (1694-1778)

- Francois Marie Arouet
- Wrote 70 books of political essays –Satire exposed the Human Nature of Stupidity and Shallow Optimism
- Made targets of the clergy, aristocracy, and government
- A Reformer, Not a Revolutionary
- Twice sent to prison for his wrtings
- “I do not agree with what you say—but will defend you to the death to say it”







## Montesquieu and the Separation of Powers

- French Writer
- Dismayed by French Absolutism
- Admired British Balance of Power
- Separation of Power--Checks and Balances (Between Monarch/Nobility)
- Strong Independent Upper Class to Check Power of Ruler
- Not a Proponent of Democracy or Republics--Uneasy about the Uneducated Poor





## Rousseau and Social Contract

- Wrote a book called “The Social Contract”(1762)
  - Agreement between the people, not between Government. and people (Hobbes)--role of individual as member of society
  - Government Must Follow “General Will”, or Citizens May Rebel
- Born with Natural Rights: Life, Liberty and Property

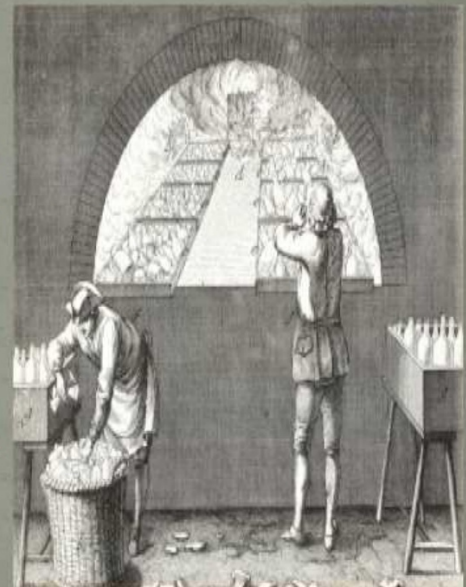






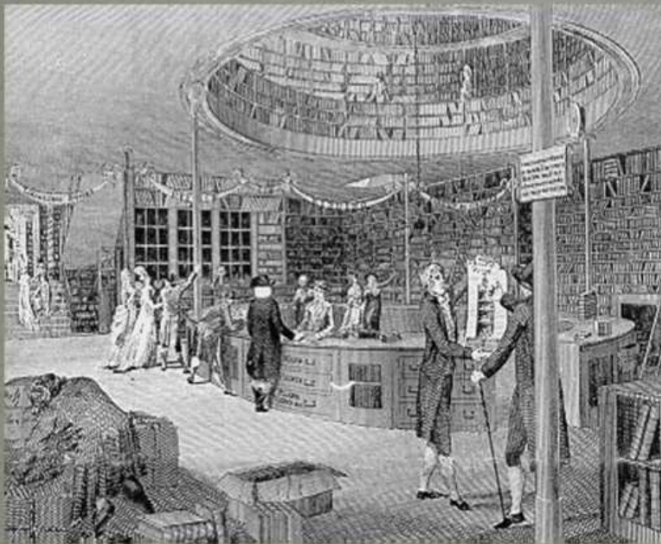
# The Encyclopedia

- Greatest and Most Representative Intellectual Achievement of the Enlightenment
- Many Contributing Authors to Hundreds of Thousands of Articles to Teach People How to Think Critically and Objectively about all Matters--17 Volumes
- Revolutionary Effect--Open Forum for Education and Criticism
- Triumph of Rationalism
- Greater Knowledge Leads to Greater Human Happiness
- Knowledge Created Path for Progress
- Illustrations--Convey Practical Knowledge





# The Problem of Censorship



- The Attempt of the Old Regime to Control New Thinking
- Publishers and Writers Hounded by Censors
- Over 1000 Booksellers and Authors Imprisoned in the Bastille in the Early 1700's C.E.





# An Attack on the Old Regime



# The World of the Old Regime



- Built on Tradition
- World of Hierarchy, Privilege and Inequality
- Allied with the Church
- Challenged by the Reform Impulse of Supporters of the Enlightenment



# The Salon

- Free discussion and social interchange free of concern for censorship
- Variety of Content
- Mixing of Social Groups
- Educational
- Influence on Art







# The Role of the Salon



- Protection and Encouragement Offered by French Aristocratic Women in their Private Drawing Rooms
- Feminine Influence on the Enlightenment
- Madame Geoffrin



## The Salon

And I am all  
About interior  
design

The salons of the  
Enlightenment are not so different.  
We talk about many issues of  
human nature, literature, philosophy,  
And other topics.





# Impact on American Revolution

- Enlightenment Writings
- Locke's Influence on Jefferson
- Montesquieu's Influence on Franklin
- Religious Toleration
- Natural Rights
- Right to Rebellion







## Overall Influence of Enlightenment

- France on Decline
- Reforms Limited by Internal Struggles for Power
- Increased Religious Toleration and Separation of Political and Religious Spheres
- French Revolution Brings End to Reforms
- Laid Groundwork for the Revolutionary Movements of 18th and 19th Centuries



## Social Impact of Enlightenment

- In Early Modern Europe, Peasants and Nobles had Similar Cultural Experiences
- With the Enlightenment, now the Upper Class Experienced a Print Culture and Social interaction Quite Different
  - Appreciation for Scientific Learning
  - Appreciation for Secular Learning
- The Poor, Relied on Oral Traditions and Held More Tightly to Religious Beliefs and Traditions
- Only Modest Improvements and Life of Peasantry Remains Hard

***Essential Question #3 – What is absolutism as seen a comparison of the rules of Louis XIV, Tsar Peter the Great, and Tokugawa Ieyasu?***



## ***Absolutism***

*What is it? - pg. 594-595*

*List the the reasons that a country allows for itself to be controlled by one person.*

## *King Louis XIV - France*

*1638-1715*



*"I am the State"*

- *Improved the economy of France.*
- *Weakened the Power of the Nobles*
- *Was a Patron of the Arts*

*How did he accomplish these things?*

*pg. 599-600*

## *Tsar Peter the Great*

- *Traveled to Western Europe - and became determined to modernize Russia - "westernization"*
- *Brought Russian Orthodox Church under State control.*
- *Reduced the Power of the Nobility.*
- *Modernized army*
- *Promoted Education*



*1672-1725*



## *Tokugawa Ieyasu*

*pg. 543*

- *Controlled Daimyo*
- *Traded with Portugese*
- *Confucian Society*
- *Accepted Christians at first beofre later banning them...Jesuits*



*Shogunate ruler  
1543-1616*



